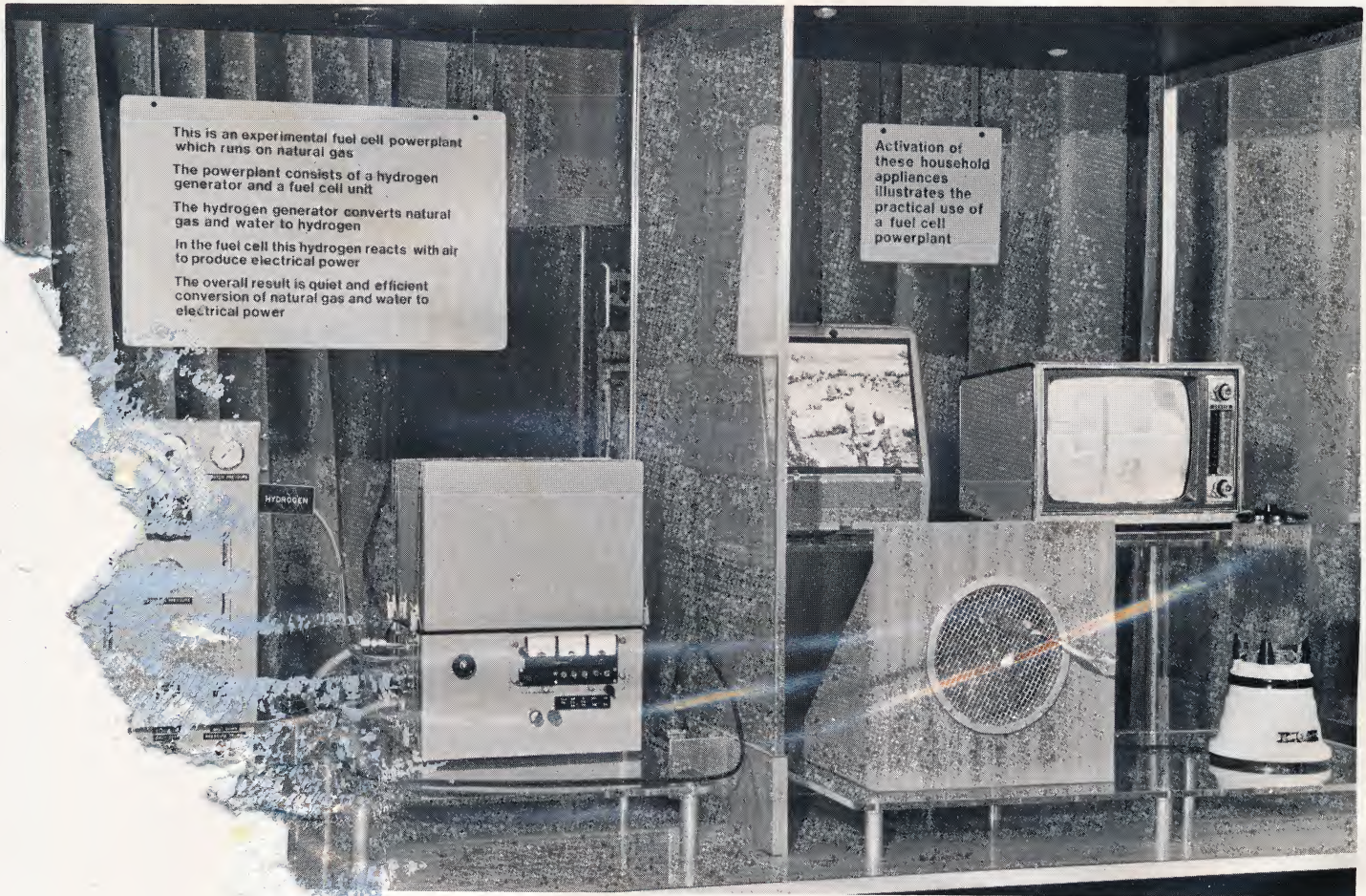


POWERCEL[®] NEWS

Air Force Association – Sheraton Park Hotel, Washington, D. C. – Sept. 14-16, 1966



CELLS

of United Air-
on/air fuel cell
e day, generating
et a blender, a fan,
This display provided
actical demonstration of
ations. The photograph
strates the relative size of the cell, as
with the four appliances.

er cel 9 consists of two units, a hydrogen
ator, which produces hydrogen gas from a

natural-gas fuel, and a hydrogen/air fuel cell assembly which releases 500 watts of electrical energy by combining the hydrogen with air in the presence of an alkaline electrolyte.

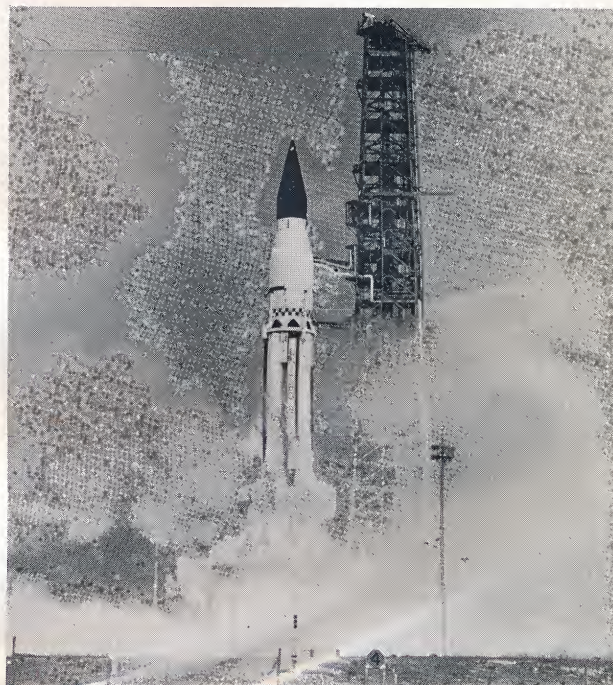
- Powercel 9, built under contract to the U.S. Army Electronics Command with participation by personnel from the Electronics Systems Division of the Air Force Systems Command, will be evaluated by military personnel later this year. The two units of Powercel 9, carried in backpacks, will each weigh approximately 35 pounds.

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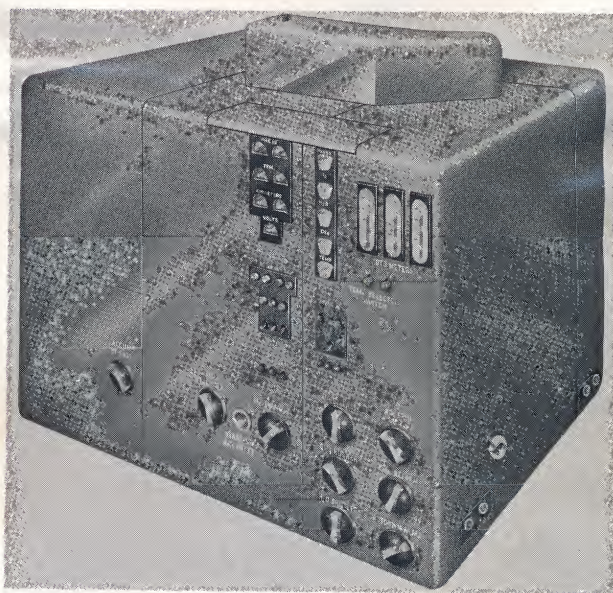
FIRST SPACE SUCCESS

On August 25, 1966, the first Apollo space shot with operating fuel cells roared aloft from Cape Kennedy, Florida. After a 93-minute sub-orbital flight which included a boosted 19,000 mph re-entry simulating the worst conditions that astro- could encounter on return from orbit, the craft landed in the Pacific near Wake Island. Reports indicate that the Powercells operated successfully, meeting all requirements of the mission. The program is now on to its next stage, which will con- sidered orbital flight late this year, with providing water, and electrical power for communications, and life support.



COMMERCIAL HYDROCARBON/AIR FUEL CELL

The first prototype commercial version of the 3.75 kw hydrocarbon/air fuel cell, better known as the PC10, has been delivered to Columbia Gas Systems. This power system, using common fuels, is characterized by its high efficiency, silent operation, indifference to extremes of environment, absence of noxious exhaust, and simplicity of field maintenance. This same powerplant has the potential for the future above forward tactical con- sidered area weather vans, air defense



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DEVELOPED FOR AEROSPACE

NASA personnel at the Houston Manned Spacecraft Center recently operated a qualified production model Powercel 3A-2 for more than 1000 hours. PC3A-2 is the first powerplant in the field to operate for 1000 hours, a period equivalent to six round trips to the moon. In addition to supplying electricity in sufficient quantities to meet the needs of the Apollo spacecraft, Powercel 3A-2 produced 72 gallons of potable water from its hydrogen and oxygen reactants. The combined weight of the fuel cell powerplant and reactants is less than one-tenth that of batteries of equivalent power.

All MISSION CAPABILITY

above mission capability was demonstrated in a recent 1878-hour run of a complete powerplant in a vacuum environment. For this run the standard PC3A-2 was modified to incorporate a new cell electrodes.

Improvements in electrode and cell design now in development phases hold promise of a potential improvement in Powercel performance of the following magnitude:

- Power densities quadrupled at the same efficiencies.
- Weight and volume reduced by more than 50% at the same level.
- Life extended to the order of 2500 hours.

PC3A MILESTONES

- | | |
|-------------|---|
| March 1962 | Start of program. |
| June 1963 | First Powercel to attain 2 KW output. |
| March 1964 | First Powercel to attain over 400 hours of total life, including 100 hours of vacuum endurance. |
| Feb. 1965 | First qualified fuel cell powerplant in field to run 1000 hours (MSFC Houston). |
| August 1966 | Apollo Unmanned Flight |

